



United States  
Department of  
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National Institute  
of Food  
and Agriculture

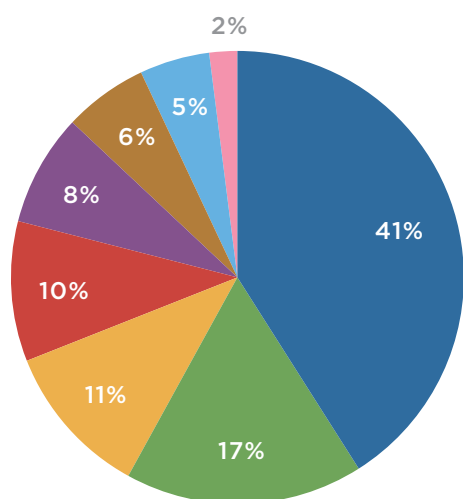
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# A Few Examples of Recent High-Impact Outcomes of NIFA Investments

**T**HE NATIONAL INSTITUTE OF FOOD AND AGRICULTURE (NIFA) is a leader in food and agricultural sciences. NIFA helps create a better future for the nation and the world by supporting research, education, and Cooperative Extension programs at the Land-Grant University System and other partner organizations. • As the U.S. Department of Agriculture's (USDA) extramural funding agency within the Research, Education, and Economics (REE) mission area, NIFA pursues scientific goals that are:

- authorized and appropriated by Congress;
- framed in the REE Action Plan (see graphic below); and
- articulated by stakeholders.

NIFA's leadership and program funds build the capacity of our nation's food, agricultural, natural resource, and human sciences system, are competitively awarded, and also support minority-serving colleges and universities. This funding and the resulting scientific progress enhance the competitiveness of American agriculture, bolster several U.S. economic sectors, enhance the protection and safety of the nation's food supply, and improve the nation's environment, natural resources, and nutrition. • Annually, NIFA provides over \$1.3 billion of congressionally appropriated funds to literally thousands of projects across our nation. The following pages contain just a few examples of successful research, education, and Cooperative Extension programs that partner institutions have developed and implemented using NIFA funding and programmatic leadership.



## NIFA EXPENDITURES BY REE GOAL

TOTAL FY2011 GRANTS = \$1.378B

Food Supply & Security	41%
Nutrition & Obesity	17%
Rural-Urban Interdependence & Prosperity	11%
Natural Resources	10%
Energy & Climate	8%
Education & Science Literacy	6%
Food Safety	5%
Other	2%

## MULTI-CROPPING

### AFRI PROGRAM INCREASES DOUBLE CROP OPTIONS

Research conducted as a result of the Agriculture and Food Research Initiative and other programs has led to the development of new hulless barley cultivars. Barley requires less nitrogen to produce and may be harvested earlier in the spring compared with wheat. Further, genetic improvements have made the crop more resilient to invasive pests and climatic extremes. Further, hulless varieties have opened poultry and beef feed markets for barley producers. Improved markets, decreased inputs, and greater timing flexibility have improved the economics of “barley-followed-by-soybean” double crop systems.



### COVER CROPPING HELPS TO PROTECT AGAINST RAVAGES OF DROUGHT

Farmers want reliable information before risking change in a risky business, and patient public investment in agricultural science helps generate the information they need. NIFA's Sustainable Agriculture Research and Education (SARE) program's early investment in innovative cover crop research, coupled with sustained educational outreach, is yielding dividends today. The popularity of cover cropping—which improves soil and protects water while reducing irrigation, fertilizer, and herbicide use—had been booming, even before the 2012 drought further demonstrated how this practice can protect farmers' fields and profitability. In 1993, SARE compiled research results into a book, “Managing Cover Crops Profitably,” which has become the go-to source for information on cover crops. To date, more than 30,000 hard copies have been distributed, with a comparable number downloaded from the Internet.

## ECONOMY AND THE WORKFORCE



### 4-H ENGAGES YOUTH TO DEVELOP TOMORROW'S AGRICULTURAL AND NATURAL RESOURCE WORKFORCE

Experiential learning is a great way to promote youth interest in adopting science, technology, engineering, and mathematics (STEM) in their future careers. NIFA-supported 4-H programs touch over 6 million children across the country every year. Several projects supported by NIFA Smith-Lever funds and special funding from the U.S. Fish and Wildlife Service taught youth to learn and apply Geographic Information Systems mapping skills that support wildlife refuge systems from the Caribbean to the Pacific, Maine to Alaska. For example, youth in Iowa tested the effectiveness of mapping using iPhones compared with Global Positioning System units. This learning experience allowed them to map features such as fences, invasive species, oak stands, and areas that need attention to conserve wildlife. Similarly, a project in Minnesota engaged teens on the White Earth Indian Reservation to conduct golden-winged warbler habitat and nesting cover mapping at the Tamarac Refuge. Such experiences help youth develop science skills and learn skills necessary for future employment.

### LEADERSHIP INSTITUTE INCREASES FARM PROFITS

Minority and lower-income farmers often find themselves at a disadvantage in terms of access to agricultural education. The Louisiana Small Farmer Agricultural Leadership Institute offers several programs to socially disadvantaged farmers and ranchers that increase confidence, production, and profits. One participant, a farmer with 400 acres of rich soil being double cropped with soybean and wheat, employed several recommended practices—including precision leveling on more than 50 percent of his acreage—which increased his wheat yield two-fold and his income by \$100,000 annually. This farmer now uses his land as a demonstration site for field days and tours to train other socially disadvantaged farmers and ranchers.

### RESEARCH DEVELOPS LOCAL FOOD NETWORKS AND MARKETING OPPORTUNITIES

Small-scale, limited-resource farmers often produce specialty crops that have broad consumer appeal on regional scales, but they often fail to capitalize on high consumer demand because they lack technical expertise, do not produce enough for commercial outlets, and lack the ability to develop successful business plans. The NIFA-funded North-South Institute (NSI) is a non-profit organization that provides technical advice in collaboration with local Cooperative Extension and develops business tools for small-scale farmers, including “Tech Packs” (production methods for seven high-demand specialty crops), investment profiles (enterprise budgets and pricing methods), and a manual of best handling practices. These materials were delivered to 210 limited-resource farmers in Florida and Alabama. NSI worked with eight lead growers (six in Florida and two in Alabama) to form a “production cluster” and developed marketing arrangements with regional outlets for sales of the crops produced by the cluster. This first cluster will encourage more small-scale, limited-resources farmers to produce high-value specialty crops and will also encourage more commercial outlets to view these growers as a source of products their customers demand.

### EFNEP PROVIDES NUTRITION EDUCATION FOR AMERICA'S POOREST OF THE POOR

NIFA's Expanded Food and Nutrition Education Program (EFNEP) addresses some of our most pervasive societal challenges—hunger, malnutrition, poverty, and obesity—by providing practical, hands-on nutrition education to the poorest of the poor. Each year, EFNEP peer educators teach more than a half million low-income families and youth how to change their behavior toward food. More than 80 percent of EFNEP families report living at or below 100 percent of poverty, and nearly 70 percent indicate being of minority status. A 2012 national review of EFNEP data showed that 95 percent of EFNEP graduates improved the quality of their diets, 88 percent improved their nutrition practices, 86 percent stretched their food dollars farther, 66 percent handled their food more safely, and 28 percent increased their physical activity by at least 30 minutes each day.



### NIFA HSI GRANT STRENGTHENS FOOD SCIENCE AND TECHNOLOGY PIPELINE

The University of Puerto Rico at Mayaguez (UPRM) is helping USDA meet its goal of attracting students from minority and under-represented groups to the agricultural and natural resource sciences. UPRM's NIFA-funded Hispanic-serving institution (HSI) education grant uses experiential learning opportunities to bring undergraduate students into its master's program in food science and technology. Student enrollment in undergraduate food science research courses has climbed to an average of 27 students for the past two semesters over a previous baseline of less than 10.

#### VETERINARY SCIENCE & ANIMAL AGRICULTURE



### 1994 LAND-GRANT VET SCHOOL: AN OASIS OF ANIMAL CARE AND STUDENT OPPORTUNITY

The Navajo Reservation in Crownpoint, NM, is located in one of the nation's many designated veterinary shortage areas even though 30 percent of the population owns livestock. To help address this situation, Navajo Technical College (NTC) dedicated NIFA Tribal Colleges Education Equity funding to enhance its teaching veterinary clinic. NTC upgraded its facilities, developed industry-standard curricula, recruited a second veterinarian to teach classes and take on additional clients, and provided farmers and ranchers with science-based information on how to run their operations more profitably. NTC students are trained to assist in small animal operations, provide large animal healthcare, and use modern veterinary lab instruments. In addition, northern New Mexico high schools are looking to NTC to provide college credit for their juniors and seniors as a stepping stone into college life. NTC plans to offer 2-year associate of science degree programs that are in line with New Mexico State University, the University of Arizona, and Colorado State University, so that NTC's vet tech graduates can move directly into a veterinary medicine program.





### **MOBILE APPS HELP DAIRY FARMERS COMPUTE COSTS AND BE ENVIRONMENTALLY FRIENDLY**

Penn State Extension has released a mobile app, "DairyCents," for dairy farmers to easily calculate their income over feed cost (milk income per cow per day, minus feed cost per cow per day). DairyCents, available for download on Android devices and iPhones since August 2012, has about 1,000 registered users in all 50 states. The app also allows farmers to enter feed prices into a national database so they can compare their costs to what others are paying. A second-generation DairyCents app, funded in part through NIFA's Mid-Atlantic Water Program, is scheduled for release this spring and will include information to help farmers keep their operations environmentally friendly.

#### **WATER AND CLIMATE**

### **NIFA-FUNDED INVENTION HELPS DROUGHT AFFECTED GROWERS**

Last year's severe drought increased the amount of nitrates in plants to potentially toxic levels and had farmers wondering if they could safely feed their livestock. The result was a large increase in demand for forage test kits. The Nitrate Elimination Company, Inc. (NECi) received NIFA Small Business Innovation Research grants to develop a new type of environmentally-friendly nitrate test kit. Compared to traditional cadmium-based test kits, NECi test kits are more cost competitive, just as sensitive, and more selective with fewer substances interfering with the tests. The U.S. Geological Survey has approved the kits for measuring nitrate in soil and water; later this year the U.S. Environmental Protection Agency is expected to approve the test kits, which will open up new markets worldwide. NECi is located in a rural, economically depressed area of Michigan. The company employs 10 people and subcontracts work to local businesses. Sales have increased slowly but are now more than \$250,000/year and expected to grow significantly in the next few years.

### **NIFA-FUNDED IRRIGATION PROGRAMS SAVE WATER AND INCREASE PRODUCTIVITY**

When agricultural crops require more water than is supplied by rainfall, irrigation water becomes a major source of competition for fresh water resources in the United States. Research pioneered at the University of California-Davis, using a combination of NIFA Hatch Act and industry funding, demonstrated that farmers could increase productivity in crops, such as almond, walnut, and plum, while using less water. This line of investigation, called "deficit irrigation," has been continued through NIFA Specialty Crop Research Initiative funding to teams studying grape irrigation practices in the Western United States and nursery and greenhouse irrigation systems in the Eastern United States. This strategy has resulted in savings of hundreds of millions of gallons of water. Such savings mean increased profitability for growers and enough water savings to meet the daily needs of millions of Americans.



#### **COEXISTENCE**

### **BIOTECHNOLOGY RISK ASSESSMENT GRANT WILL SHAPE BEST MANAGEMENT PRACTICES FOR COEXISTENCE**

Scientists from land-grant universities and the USDA's Agricultural Research Service are cooperating with the seed industry to assess how genetic material might be inadvertently transmitted from genetically engineered to conventional alfalfa. Genetics, molecular biology, entomology, and weed science researchers are exploring the roles that feral alfalfa, pollinators, and different environments play in gene flow. Greater understanding of this topic will help shape the development of science-based strategies for coexistence of identity protected and other crops.



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## Quick Response (QR) Codes to Additional Information on the Examples of Recent High-Impact Outcomes of NIFA Investments

**TO VIEW THE FULL STORY ON YOUR SMARTPHONE:** ❶ Download, install, and launch a QR Code reader app.

❷ Hold your smartphone camera over the QR Code so that it's clearly visible on the screen. ❸ The phone automatically scans the code, or you will be instructed to snap a picture of the code. ❹ Your smartphone reads the code and navigates to the full story.

### MULTI-CROPPING



AFRI program increases  
double crop options

### ECONOMY AND THE WORKFORCE



NIFA HSI grant strengthens food  
science and technology pipeline

### MULTI-CROPPING



Cover cropping helps to protect  
against ravages of drought

### VETERINARY SCIENCE & ANIMAL AG



1994 land-grant vet school:  
An oasis of animal care  
and student opportunity

### ECONOMY AND THE WORKFORCE



4-H engages youth to develop  
tomorrow's agricultural and natural  
resource workforce

### VETERINARY SCIENCE & ANIMAL AG



Mobile apps help dairy farmers  
compute costs and be environmentally  
friendly

### ECONOMY AND THE WORKFORCE



Leadership institute  
increases farm profits

### WATER AND CLIMATE



NIFA-funded invention helps  
drought affected growers

### ECONOMY AND THE WORKFORCE



Research develops local food  
networks and marketing opportunities

### WATER AND CLIMATE



NIFA-funded irrigation programs  
save water and increase productivity

### ECONOMY AND THE WORKFORCE



EFNEP provides nutrition education  
for America's poorest of the poor

### COEXISTENCE



Biotechnology Risk Assessment  
Grant will shape best management  
practices for coexistence